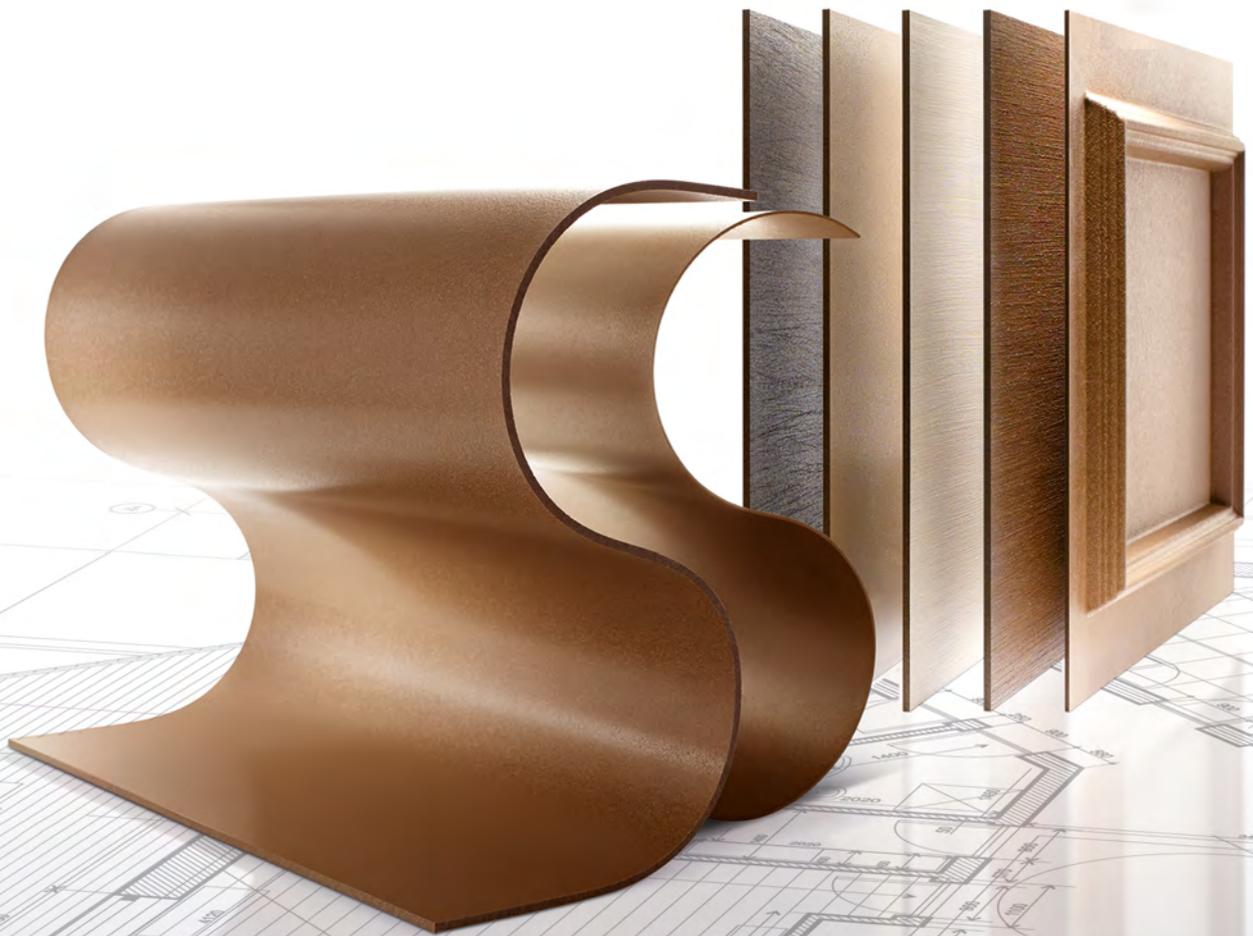


**SIMONA**



**tech.info**

SIMOWOOD made of Resysta®

GLOBAL THERMOPLASTIC SOLUTIONS

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# 1 General information

## 1.1 Properties

SIMOWOOD is the first large-scale sheet made of Resysta®, an innovative hybrid material based on rice husks and a specific type of thermoplastic. Fabrication of this Resysta® material is not in competition with food production; in this case, the rice husks used are waste products.

By roughening the surface, the extruded SIMOWOOD sheets are made to look and feel just like wood. The material can be machined with standard processing equipment, making it as versatile as wood. What is more, like plastic, the sheets are suitable for thermoprocessing, i.e. they combine the benefits of both materials in a single product.

SIMOWOOD is highly resistant to external influences such as sun, rain, snow or salt water, and as an alternative to tropical timber it also contributes to the protection of valuable natural resources. In contrast to conventional wood or wood-based products, the material used in SIMOWOOD shows no signs of swelling. Furthermore, it is UV-resistant and offers the benefit of anti-slip properties when wet (highest level of slip resistance, category C as per DIN 51097). This makes SIMOWOOD suitable for both indoor and outdoor use.

Due to the unique properties of the base material, SIMOWOOD offers many advantages compared to wood:

- No discolouration of surfaces due to chemical decomposition or leaching of timber components
- No resin discharge
- No surface erosion due to environmental influences
- No cracks due to swelling or shrinkage
- No front-face capillary action

SIMOWOOD is primarily based on natural raw materials. As a result of the special production method and composition of SIMOWOOD, some tiny air pockets may be formed. Differences in the colouration and surface finish of individual sheets are also possible, but this has no effect on the quality of the product. Due to its specific material properties and durability as well as the associated reduction in maintenance and servicing costs together with its recyclability, SIMOWOOD offers significant advantages compared to conventional building materials when it comes to life cycle costs (“cradle to cradle”). This makes SIMOWOOD the perfect choice with regard to projects in which sustainability is a key requirement.

## 1.2 Areas of application

SIMOWOOD is particularly suited to areas of application that rely on durable, sustainable and weather-proof materials with a wood-like appearance.

### Possible areas of use:

- Outdoor furniture
- Wall and facade elements
- Interiors
- Fences
- Boat-/shipbuilding (SIMOWOOD IMO)
- Wellness and wet areas
- Store fit-outs
- Exhibition stands

## 1.3 Product range

For detailed information about the current SIMOWOOD product range and other SIMONA products, please visit [www.simona.de](http://www.simona.de).

Our sales representatives also look forward to advising you:

Phone +49 (0) 67 52 14-0

Fax +49 (0) 67 52 14-211

[sales@simona.de](mailto:sales@simona.de)

## A closer look at extrusion

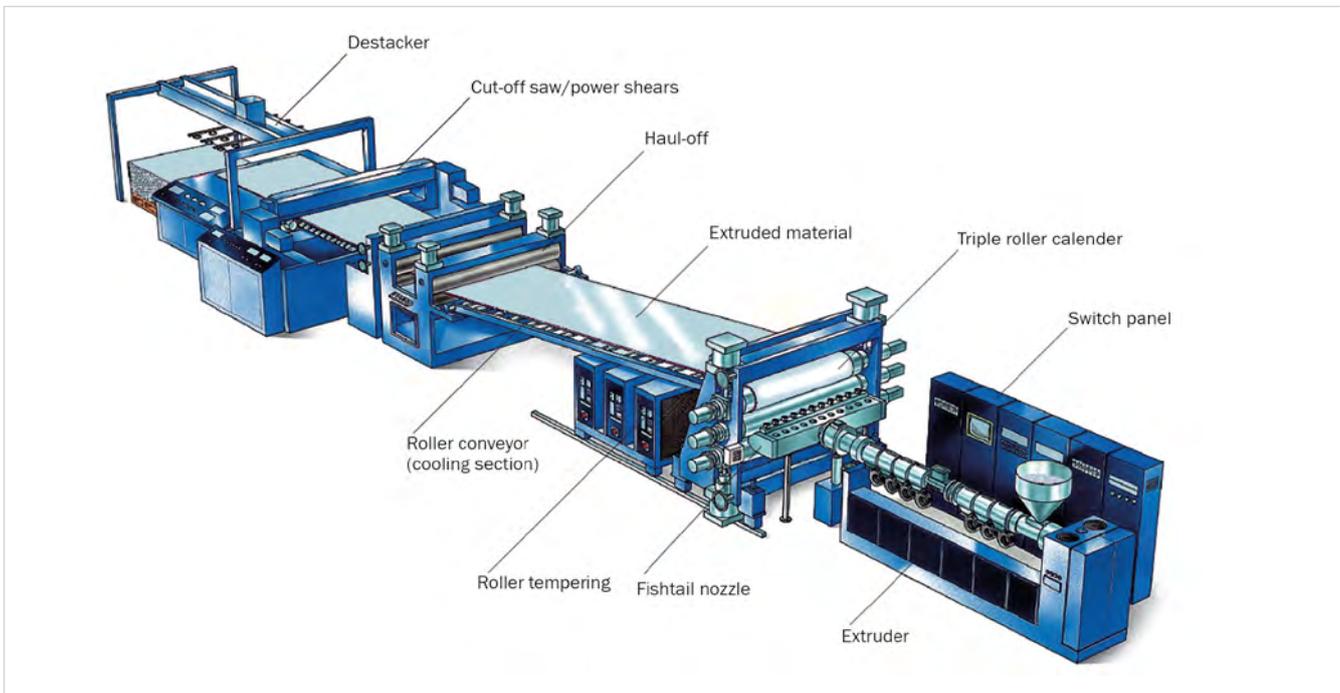


Figure 1: Sheet extrusion plant

SIMOWOOD sheets are produced by means of the extrusion method. Sheet extrusion is a thermoplastic processing method.

A sheet extrusion plant consists of an extruder, a tool sometimes referred to as a die with a fishtail design for shaping purposes, a triple roller calender to smooth the extruded material, a cooling section, a haul-off and a separating unit (saw or cutting device) and a destacker (see Figure 1).

By applying heat, shearing and pressure, the raw Resysta® material is heated during the extrusion process to convert it into a viscous fluid form. A rotating screw presses this molten material through a shaping tool – fishtail nozzle (similar to a meat grinder). The surface of the calender rollers generally has a high-gloss finish. It essentially determines the surface quality of the sheet. The shaping process is complete once the calender has performed its smoothing task. After the extruded material has cooled down on the roller conveyor, sheets are produced by being cut to the desired length in the separating unit before being off-loaded onto transport pallets by the destacker.

## 2 Technical information

### 2.1 Material specifications

#### Technical data

		SIMOWOOD	SIMOWOOD IMO
Density, g/cm <sup>3</sup> , DIN EN ISO 1183		1.49	1.51
Yield stress, MPa, DIN EN ISO 527		24	25
Elongation at break, %, DIN EN ISO 527		1	1
Tensile modulus of elasticity, MPa, DIN EN ISO 527		3,500	3,800
Flexural modulus of elasticity, MPa, DIN EN ISO 178		3,450	3,800
Flexural strength, MPa, DIN EN ISO 178		41	44
Heat deflection temperature (0.46 MPa), °C, ISO 75		74	77
Shore hardness D (15 s), DIN EN ISO 868		75	77
Mean coefficient of linear thermal expansion, K <sup>-1</sup> , ISO 11359-2		4.3 x 10 <sup>-5</sup>	4.3 x 10 <sup>-5</sup>
Screw extraction surface resistance, N, DIN EN 320		3 mm: 650, 4 mm: 1,020, 5 mm: 1,250, 8 mm: 2,210	3 mm: 650, 4 mm: 1,020, 5 mm: 1,250, 8 mm: 2,210
Slip resistance (in wet areas), DIN 51097		Classification Group C	Classification Group C
Fire behaviour	DIN 4102	B2 normal flammability (self-assessment without test certificate); B1 low flammability on request	B1 low flammability (self-assessment without test certificate)
	UL 94	V0: ≥ 1 mm (self-assessment without test certificate)	V0: ≥ 1 mm (self-assessment without test certificate)
	IMO	-	FTP Code 2010, Annex 1, Part 5

All specifications are deemed to be approximate values in respect of the specific material and may vary depending on the processing methods used. In general, data specified applies to average values measured on extruded sheets with a thickness of 4 mm. In the case of sheets manufactured by means of pressing, testing is generally performed on sheets with a thickness of 20 mm. Deviations from the values specified are possible if the sheets in this thickness are not available. In the case of backed sheets, all technical specifications relate to the non-backed base sheets. Information presented herein is not necessarily applicable to other products (e.g. pipes, solid rods) of the same material or products that have undergone downstream processing. Suitability of materials for a specific field of application must be assessed by the party responsible for processing or the end-user. All technical specifications presented herein are designed merely to provide assistance in terms of project planning. They do not constitute a guarantee of specific properties or qualities. For further information, please contact our Technical Service Centre at [tsc@simona.de](mailto:tsc@simona.de).

## 2.2 Fire behaviour

SIMOWOOD can be classed as a standard building material (B2) with normal flammability as per DIN 4102 (B2) (self-assessment without test certificate). A special SIMOWOOD FR version is also available, which is classified as a low-flammability (B1) product in accordance with DIN 4102.

On request, SIMONA can also supply a version that meets International Maritime Organisation (IMO) specifications for low flammability. As the material meets the aforementioned requirements, SIMOWOOD IMO is suitable for boat- and ship-building purposes and can be used on bulkheads, walls, ceilings, linings or floor coverings.

In the event of a fire, hydrogen chloride gas and other broken down by-products may be released. For this reason, SIMOWOOD should not be burnt without taking suitable emission control precautions. Offcuts and/or sanding dust, as with any other thermoplastic material, should be properly disposed of. Please follow the instructions of your local disposal expert.

For further information, please consult the EC Safety Data Sheet ([see 6. EC Safety Data Sheet](#)).

## 2.3 Performance in outdoor use

SIMOWOOD is extremely resistant to external influences such as sun, rain, snow or salt water. As the Resysta® material is also UV-resistant, SIMOWOOD is suitable for outdoor use. For optimal protection and to avoid bleaching of the material due to natural causes, we generally recommend application of a varnish or sealant ([see 3.4 Surface treatment](#)).

Temperature changes can alter the dimensions of any material. For this reason, the thermal expansion coefficient should be taken into account when cutting and assembling SIMOWOOD sheets. The thermal expansion coefficient of plastics is significantly greater than that of metal or wood and must therefore be taken into account when SIMOWOOD is used in areas that are subject to a high degree of temperature fluctuation.

Cutting and assembly of SIMOWOOD sheets should be completed under stable temperature conditions. It is recommended that the material is stored in the shade or in areas with no direct sunlight before being cut or assembled, as the material can significantly heat up in the sun and expand accordingly. We recommend storing the product for at least 24 hours at a consistent temperature that corresponds to that of the subsequent area of application.

The mean thermal expansion coefficient as per ISO 11359-2 for SIMOWOOD is  $4.3 \times 10^{-5} \text{ K}^{-1}$ , i. e. for a temperature difference of 10 °C the dimensional change is approx. 0.43 mm per lineal metre (see Figure 2).

Apart from its composition, the processing method, handling conditions and design of the finished product, as well as the resultant tension exerted on it, will all have an effect on the lifespan of the material. The latter is also influenced by ambient conditions as well as strains and stresses exerted during installation and processing.

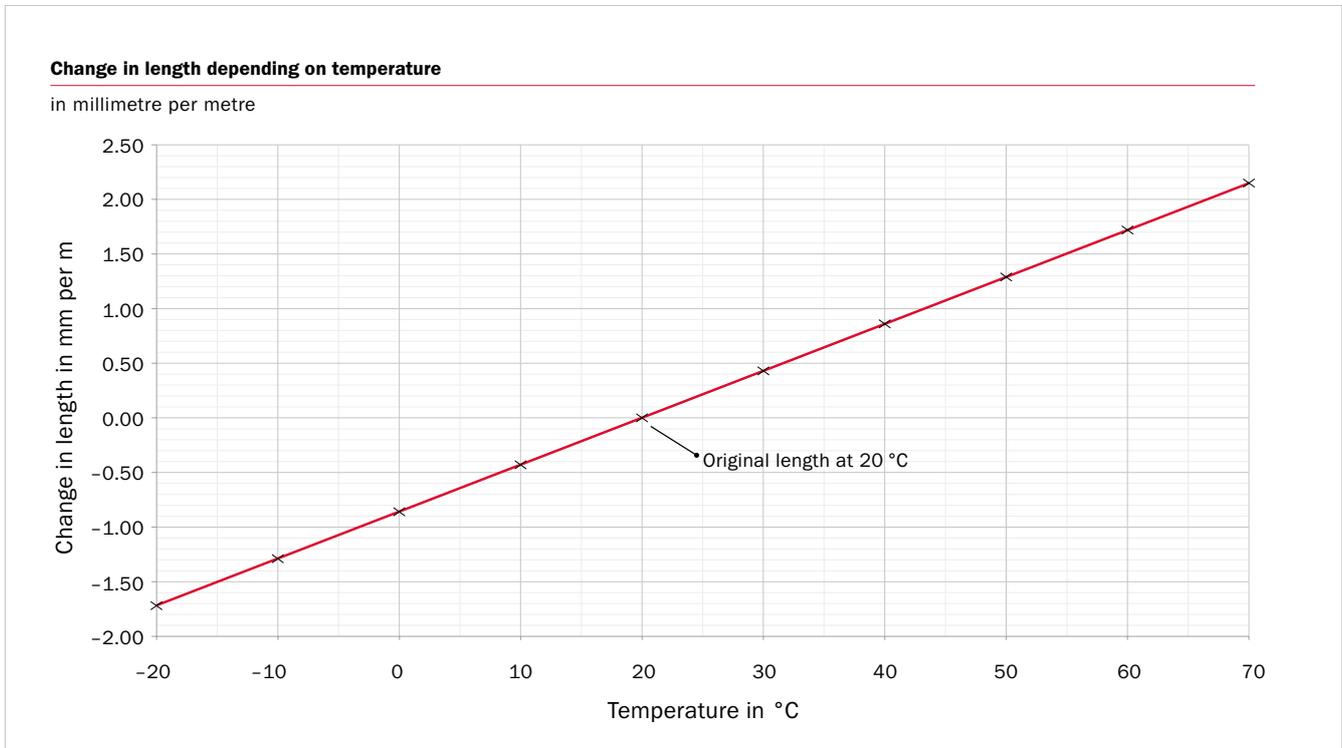


Figure 2: Thermal expansion in relation to room temperature (simplified linear depiction)

## 2.4 Water absorption

Due to the roughening of the surface, the organic constituents on the surface of the product may absorb moisture, particularly in non-varnished and non-sealed sheets. Moisture comes into contact with the surface area (so-called wetting). The penetration of moisture on the cut edges and non-sanded surfaces is minimal due to the smoother surface. However, water can penetrate into open pores. Water absorbed in this way does not initiate any rotting processes; it can be released again during drying.

In contrast to conventional wood or wood-based products, SIMOWOOD shows no signs of swelling when exposed to water. Furthermore, it offers the benefit of anti-slip properties when wet (highest level of slip resistance, category C as per DIN 51097). As regards slip protection in general working environments, SIMOWOOD is expected to achieve classification R10 at the very least (self-assessment without test certificate; no tests were conducted in accordance with DIN 51130).

## 2.5 Temperature range

SIMOWOOD is based on a thermoplastic material and therefore displays the usual properties of a thermoplastic when exposed to higher temperatures. In the case of parts not subject to mechanical wear and tear, we therefore recommend a maximum operating temperature of 65 °C. Depending on the level of wear and tear, the maximum operating temperature may be lower than 65 °C.

## 2.6 Resistance to microorganisms and insects

SIMOWOOD does not act as a food source for:

- Microorganisms
- Bacteria
- Mould (fungi that discolours or destroys wood)
- Gnawing insects

Depending on the environment in which it is used, organic residues may be deposited on SIMOWOOD. These are the ideal breeding ground for the kind of fungal spores naturally present in the ambient air and may lead to staining. However, the material itself will not deteriorate as a result. For optimal protection, we recommend cleaning SIMOWOOD where required and removing any organic residues (e.g. leaves or foliage).

## 2.7 Disposal

SIMOWOOD offcuts and/or sanding dust should be properly disposed of, as with any other thermoplastics. Please follow the instructions of your local disposal expert.

In the event of a fire, hydrogen chloride gas and other broken down by-products may be released. For this reason, SIMOWOOD should not be burnt without taking suitable emission control precautions.

For further information, please consult the EC Safety Data Sheet ([see 6. EC Safety Data Sheet](#)).

# 3 Processing information

## 3.1 Machining

### 3.1.1 Drilling

SIMOWOOD can be drilled using standard spiral drills. No special grinding is generally required. However, we do recommend the use of drill bits with relief ground cutting edges and small twist angles. If the rake angle of the bit has been negatively ground for drilling holes, it prevents the bit from jamming and the material from breaking. This is recommended up to a drill hole depth of approx. 15 mm. If the drill hole is longer than  $5 \times \varnothing$ , it is advisable to withdraw the bit from the hole a number of times in order to extract the shavings efficiently. If the drill hole is more than 10 mm in diameter, pre-drilling is to be recommended. Drill holes exceeding 20 mm in diameter can be created more efficiently using double-edged bits with a pilot, while drill holes exceeding 40 mm in diameter are best made with circle cutters. The use of Forstner bits is also possible.

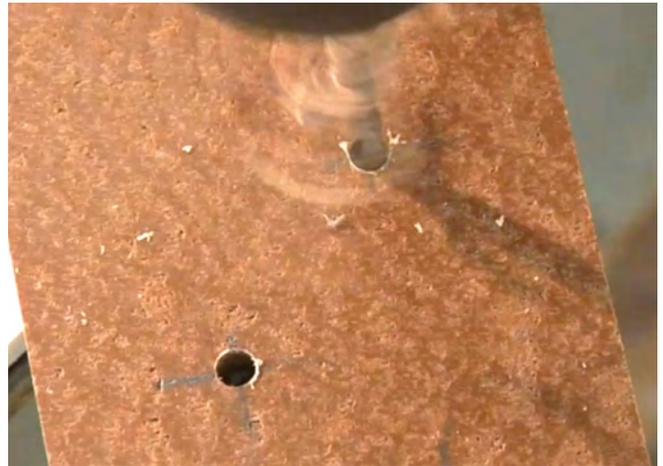


Figure 3: Drilling

#### Drilling

	SIMOWOOD
Lead angle $\alpha$	6 - 10
Twist angle $\beta$	12 - 16
Rake angle $\gamma$	3 - 6
Nose angle $\varphi$	80 - 120
Cutting speed m/min v	30 - 80
Forward feed s	0.1 - 0.5

Cutting speed and forward feed depend on the depth of the drill hole. If the proper processing parameters are observed, no smearing of the material will occur.

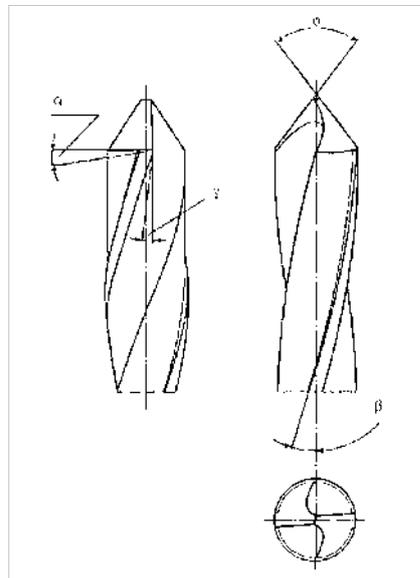


Figure 4: Drills



**i** For further information, please view our [“Drilling and screw-fixing”](#) video.

### 3.1.2 Milling

All standard milling machines used in metal machining and designed for high speeds are suitable. High cutting speeds and small cutting depths are recommended.

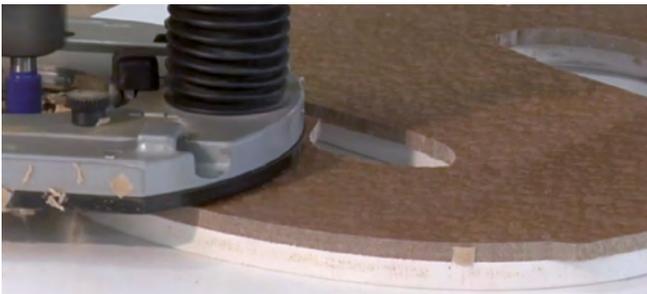


Figure 5: Milling

### 3.1.3 Dressing/Planing

The edges can be planed with the usual tools and conventional planing and thickness planing machines. Manual files and handheld electric planers can also be used to dress the sheets.



Figure 7: Planing

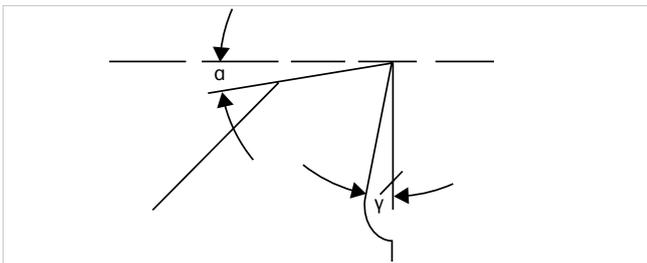


Figure 6: Cutting geometry

#### Milling

	<b>SIMOWOOD</b>
Lead angle $\alpha$	5 - 10
Rake angle $\gamma$	5 - 20
Cutting speed m/min $v$	300 - 1,000
Forward feed $s$	0.1 - 0.5



**i** For further information, please view our ["Milling"](#) video.



**i** For further information, please view our ["Gluing and planing"](#) video.

### 3.1.4 Sawing

SIMOWOOD can be cut lengthwise and crosswise with all the usual sawing equipment.

#### Circular saws

To achieve clean cutting edges, the saw blade should only project slightly beyond the SIMOWOOD sheet in each case.

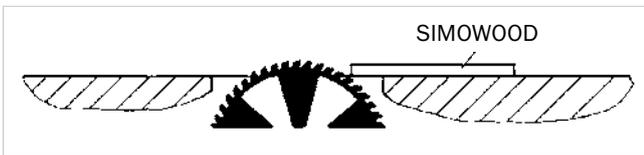


Figure 8: Sawing

Use of carbide-tipped saw blades improves cutting performance and quality, while also considerably extending the tool life of the saw blade.

We recommend using saw blades with small tooth pitches to cut through SIMOWOOD (e.g. saw blade 220 mm Ø, with approx. 88 teeth).

#### Circular saws

	<b>SIMOWOOD</b>
Lead angle $\alpha$	5 - 10
Rake angle $\gamma$	0 - 5
Cutting speed m/min v	2,500 - 4,000
Tooth pitch t	3 - 5

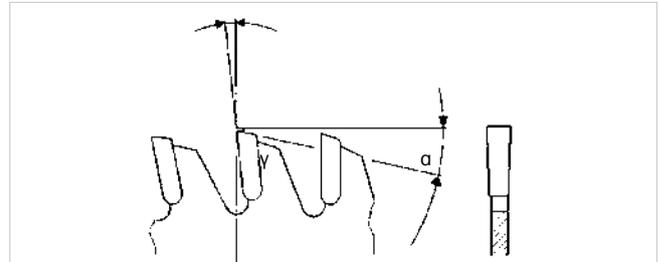


Figure 9: Carbide-tipped saw blade

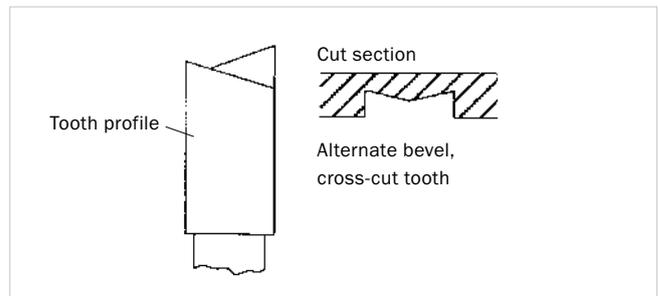


Figure 10: Tooth profile carbide-tipped circular saw blades

#### Band saws

Due to its rotating saw band, heat dissipation is more efficient when a band saw is used. The saw bands must be sharp and set correctly in order to achieve a clean cut.

#### Band saws

	<b>SIMOWOOD</b>
Lead angle $\alpha$	30 - 40
Rake angle $\gamma$	0 - 5
Cutting speed m/min v	up to 2,000
Tooth pitch t	2 - 5



**i** For further information, please view our ["Sawing"](#) video.

### 3.1.5 Sanding

SIMOWOOD comes sanded on one side as standard. To give unsanded SIMOWOOD the look and feel of wood, sanding of the semi-finished product is necessary. Sanding may be done by hand or with suitable sanding machines (e.g. belt sanders), but in any event the sheets should always be sanded in the same direction (cross-wise or lengthwise).

Depending on the desired surface finish, we recommend the use of sandpaper with a grain of 24 to 60. It is best to begin with a coarse grain paper, followed by progressively finer sandpaper until a smooth surface is achieved. Finer sandpaper should only be used to remove surface dirt.

The look and feel of wood may not be achieved if the sandpaper is too fine or the product is sanded using a circular motion. However, this will have no adverse effect on the quality of the product.



Figure 11: Sanded SIMOWOOD

For optimal protection of the finished surface, we recommend application of a sealant ([see 3.4 Surface treatment](#)).



**i** For further information, please view our [“Sanding and varnishing”](#) video.

## 3.2 Joining

### 3.2.1 Screw fixing

We recommend appropriate pre-drilling for all screw diameters. To minimise the risk of breaking around the edges, the minimum distance of 20 mm from any edge should be maintained for all screws.

As a rule, the use of flat-head screws is recommended. When using flat-head screws, they should be countersunk so the material is not put under pressure. Please refer to the Technical Data Sheet for information about screw extraction resistance ([see 2.1 Material specifications](#)).

Lower-stress joining can be achieved with the help of special plastic screws. Here, too, pre-drilling is essential. For further information, please refer to documentation provided by the respective suppliers of screws.

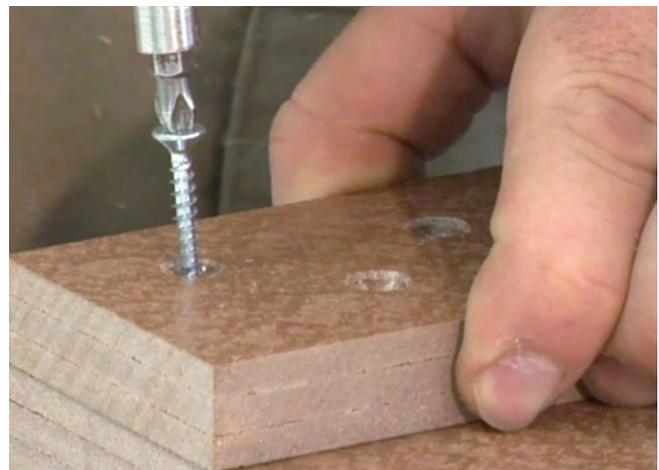


Figure 12: Screw fixing

In application areas prone to temperature fluctuation, the thermal expansion coefficient should be taken into account. In this case, a larger drill hole and the use of so-called plumber screws (screws with washers) may be advisable ([see 3.5 Outdoor applications](#)).



**i** For further information, please view our [“Drilling and bolting”](#) video.

### 3.2.2 Riveting/Nailing

We do not recommend driving any rivets/nails into SIMOWOOD as this may lead to cracking or breaking of the sheets. Even pre-drilling the nail holes will not rule out the chance of tension cracks appearing. Depending on the specific field of application, we recommend testing the proposed method on sample sheets.

### 3.2.3 Gluing

SIMOWOOD can be glued. Due to the host of different gluing agents available and the various options for gluing SIMOWOOD to different kinds of surface materials, we recommend conducting preliminary tests on sample sheets. Good results can be expected from glues (from various manufacturers) suitable for hard plastics (rigid PVC/PVC-U). They include, for example, STPU (hybrid) adhesives, one-part adhesives and two-component PU/PUR adhesives as well as polyester and epoxy resins. When using adhesives it is also advisable in many cases to pre-treat the substrate with a cleaning agent or primer.

As the table below shows, we recorded good short-term results and good adhesive properties when bonding SIMOWOOD with various substrates. The adhesives listed in the table are merely suggestions; their use is not mandatory. The suggestions presented here are based on our in-house tests as well as recommendations made by adhesive manufacturers. Furthermore, the list does not purport to be complete in any way.

For other material combinations, please speak to your preferred adhesive supplier or contact our Technical Service Centre ([tsc@simona.de](mailto:tsc@simona.de)). We work in close cooperation with other well-known producers of adhesives and are committed to reviewing our knowledge continuously as regards SIMOWOOD bonding by means of adhesives.

Depending on the application area, the following points are important when gluing:

- Gluing of the sheets prior to mounting
- Application of pressure to the adhesive seam
- Hydrolytic stability of the adhesive
- Temperature of application
- Pot life
- Thickness of the adhesive bond
- Clean and grease-free surface

In all cases, please always refer to the technical data sheets of the respective manufacturers.



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**i** For further information, please view our [“Gluing and planing”](#) video.

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### Gluing of SIMOWOOD with various substrates

	3M	Henkel	OTTO Chemie	Phenoplast	SCHÖNOX	SIKA	Tesa	Weber, Saint-Gobain	Weiß Chemie
<b>Substrate</b>									
SIMOWOOD (sanded and unsanded)	VHB 4932 VHB RP 32	Tangit PVC-U	OTTOCOLL® M500 <sup>①</sup> OTTOCOLL® AllBert <sup>①</sup> OTTOCOLL® HiTack <sup>①</sup> OTTOCOLL® RakeiRaif <sup>②</sup>	Phenoplast KF	*	*	ACX Plus 7078	*	COSMO PU-160.450 COSMO PU-180.120 COSMO PU-200.180
Gypsum plaster	*	*	OTTOCOLL® AllBert <sup>①</sup>	*	*	*	*	*	*
Concrete	*	*		*	PU 900 <sup>③</sup>	*	*	weber.xerm 844	*
Rigid PVC	VHB 4932 VHB RP 32	Tangit PVC-U		*	*	Sikaflex®- 291i <sup>④</sup> Sikaflex®- 298 <sup>④</sup>	*	*	*
Steel, aluminium	VHB RP 32	*		*	PU 900 <sup>③</sup>	*	ACX Plus 7078	*	*
Tiles (glazed/ unglazed)	*	*		*	*	*	*	*	*
Wood	*	*		*	PU 900 <sup>③</sup>	Sikaflex®- 291i <sup>④</sup> Sikaflex®-298 <sup>④</sup> Sikaflex®-290i DC <sup>④</sup>	*	*	*
GFRP	*	*		*	*	PU 900 <sup>③</sup>	Sikaflex®- 291i <sup>④</sup> Sikaflex®-298 <sup>④</sup>	*	*

\* No specific adhesive product was tested or no relevant information is available from the adhesive producer.

① In combination with OTTO Primer 1216 or 1227

② For unsanded surfaces

③ Marine engineering, IMO-certified, for indoor applications

④ Marine engineering, IMO-certified

### 3.3 Thermal processing

#### 3.3.1 Warm bending

The linear bending zone of a SIMOWOOD sheet can be heated in various ways on one or both sides:

##### 1. Without contact

- With heaters (infrared or quartz heaters)
- With glow wires or heating rods
- With a hot-air blower

##### 2. With direct contact

- With flat heating elements

After adequate warming (the sheet can be bent easily and without any major resistance), the SIMOWOOD sheet is bent at the desired angle and locked until the material has solidified again. Blowing with compressed air accelerates cooling. The minimum bending radius can be assumed to be double the wall thickness of the sheet.

If the sheet is bent at an extreme angle, the material may tear, particularly where polished or sanded surfaces are concerned. We therefore recommend performing some preliminary tests on sample sheets.



Figure 13:  
SIMOWOOD after warm bending

##### Warm bending parameters

	SIMOWOOD
Heating time	approx. 3 min per mm sheet thickness
Temperature	120 °C – 130 °C



**i** For further information, please view our [“Warm-bending”](#) video.

In the case of sheets that have already been glazed and sealed, warm bending may cause cracking of the protective glaze. Therefore, we recommend treating the surface once warm bending has been completed.

Owing to the long retention time, blistering may occur if the oven temperature is too high.

Cold bending of this material is not advisable due to the risk of rupturing.

#### 3.3.2 Welding

Due to its thermoplastic properties, SIMOWOOD can be butt welded. However, welding of SIMOWOOD is recommended purely for optical reasons. The welding seam should not be subjected to any major mechanical strain. The welding bead that is formed can be rubbed off and the welding seam sanded over again if desired. Depending on the surface colour in each case, an optical difference may be noticeable.



Figure 14: Weld bead

##### Butt welding parameters

	SIMOWOOD
Pressure	0.3 N/mm <sup>2</sup>
Change-over time	20 sec
Heating time	80 sec
Joining time	16 min
Temperature	230 °C



**i** For further information, please view our [“Welding”](#) video.

### 3.3.3 Thermoforming

SIMOWOOD can be thermoformed up to a thickness of 3 mm under the following conditions:

- Use of a male mould
- Flat-forming with no sharp edges or corners
- Use of appropriate radii
- Adherence to the right forming temperature to avoid damage to the material (the heating time depends on the source and intensity of heat)

#### Guidelines for thermoforming

	<b>SIMOWOOD</b>
Forming temperature	195 °C - 205 °C
Heat-up time	~ 25 sec per mm sheet thickness
Tool temperature	< 50 °C
Maximum draw ratio	1 : 1.1

When forming sanded sheets in particular, optical and structural surface changes may occur.

As is the case with all thermoforming procedures, material shrinkage must be taken into account. Additionally, please note that the direction of extrusion may not necessarily correspond to the direction of sanding.

We therefore recommend conducting preliminary tests on sample sheets. Our Technical Service Centre is happy to offer advice and support. For further information, please refer to our processing instructions: “Thermoforming, vacuum forming, deep-drawing, hot-forming, bending”.

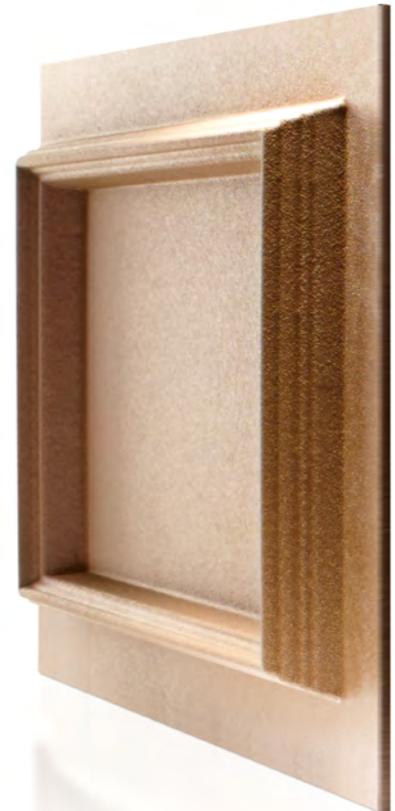


Figure 15:  
Thermoformed SIMOWOOD



**i** For further information, please view our [“Deep-drawing”](#) video.

### 3.4 Surface treatment

Resysta's surface glazes and sealants are specifically formulated to suit the properties of SIMOWOOD in terms of their spreadability and adherence. To achieve an optimal result, we therefore recommend that only these products be used to treat the surface of SIMOWOOD. For further information, please also refer to the Resysta's documentation at [www.resysta.de](http://www.resysta.de).

A surface coating may be applied to SIMOWOOD without any fear of the glaze or seal lifting when exposed to moisture. Time-consuming sanding and repeated glazing or varnishing is not necessary.

SIMOWOOD displays no capillary action. However, moisture may penetrate hollow sections and cracked areas. Front-face paint protection is not strictly necessary, but recommended for aesthetic reasons. Water may be absorbed at surface level.

Surface treatment of SIMOWOOD is recommended for the following reasons:

- To add colour
- To protect from soiling
- To protect from fading

In order to maintain the installation condition over an extended period of time, SIMOWOOD has to be glazed and sealed or treated with a similar (recommended) substance. The number of glaze and sealant coatings to be chosen will depend on the field of application. In the majority of cases, one coating of each will be sufficient. Multiple coatings of coloured glaze will create darker hues. Multiple coatings of sealant will help to improve surface protection, but may also have an influence on how the surface feels (so-called haptics).

As an alternative to Resysta® coloured glazes (FVG) and protective varnish (RFS), you can also use Resysta® Top Oil (RTO). For further information, please visit [www.resysta.de](http://www.resysta.de).

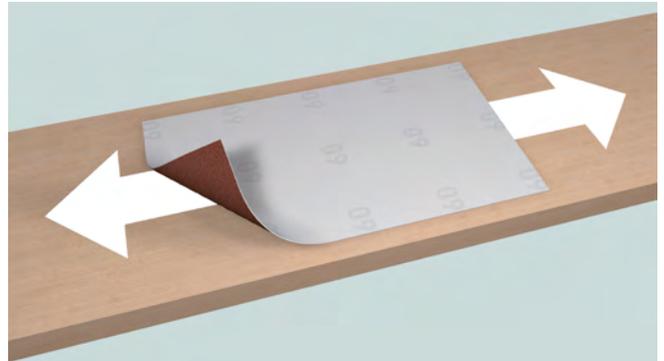


Figure 16: Sanding

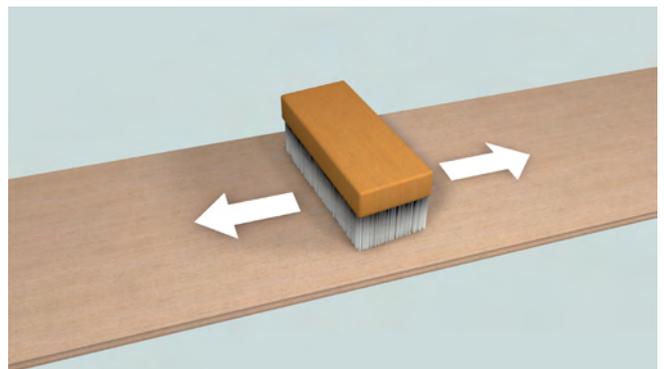


Figure 17: Brushing

Due to the fire retardant added to SIMOWOOD FR and SIMOWOOD IMO, these products are slightly lighter in colour than the standard material. Therefore, the overall effect of glazes and oils may differ marginally depending on the actual product.

To ensure the best possible adherence of the glaze or sealant, SIMOWOOD should be properly prepared before any treatment is applied.

To remove minor impurities and loose particles, we recommend 80 – 100 grain sandpaper. Apply the sandpaper to SIMOWOOD lightly and by hand only. On cut edges, scratches or more stubborn grime, use 24 – 60 grain sandpaper.

Loose particles and sanding dust can be removed with a brush.

### 3.4.1 SIMOWOOD sanded/untreated

**Properties:** Due to the open structure of the sanded surface, grime and dirt may be deposited more easily on the sheets. Untreated SIMOWOOD, i.e. with no glaze or seal applied, will become slightly lighter in colour over time. No greying occurs. The durability of the material is not affected by the intensity or frequency of care applied to SIMOWOOD. The surface can also be glazed or varnished at a later point in time.

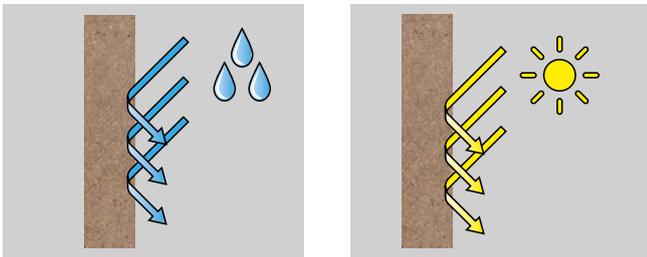


Figure 18: sanded/untreated SIMOWOOD

The surface of SIMOWOOD is exposed directly to water (rain) and UV rays.

**Cleaning:** SIMOWOOD should not be subjected to harsh (e.g. acidic, chlorine or solvent-based) cleaning agents as they may damage the surface of the material. We recommend spot-testing any cleaning agent on an inconspicuous area.

Dirt can be removed with a gentle stream of water (e.g. garden hose, high-pressure water blaster at an appropriate distance) or a soft brush. Stubborn grime (e.g. organic residues or greasy marks) may be removed with a harder brush or by lightly sanding the affected area. Stains caused by water can be rinsed with hot water.

**Care/maintenance:** Regular care (e.g. oiling) or maintenance is not necessary. SIMOWOOD can also be glazed and/or sealed at a later point in time. Before doing so, the untreated sheets should be thoroughly cleaned and lightly sanded.

### 3.4.2 SIMOWOOD sanded and glazed

**Properties:** The surface is coloured by applying transparent Resysta® glazes, but the open structure of the sanded surface is retained, which allows dirt or other impurities to adhere to the sheets more easily. The colour will become slightly lighter over time. Higher pigment glazes, however, tend to be less affected by such colour changes than lower pigment glazes.

**Applying the colour glaze:** In order to achieve an even and optimal colour result, the Resysta® glaze should be applied under stable conditions. For this reason, we recommend applying the glaze to the individual sheets before assembling them at an operating temperature of about 5° – 25°C and relative humidity of about 50 – 60 %. Please do not apply the glaze under the influence of direct sunlight or when rain is forecast. It is best to apply the glaze quickly using a broad brush or spray gun. Drill holes, dowel holes and cut surfaces that occur after assembly or mounting of the sheets should be glazed last. To repair any scratches or damage, dab some of the glaze on a cloth and apply it to the affected areas.

SIMONA recommends using Resysta colour glazes as they have been specially formulated for the material. For detailed information, please refer to the instructions for applying Resysta® glazes.

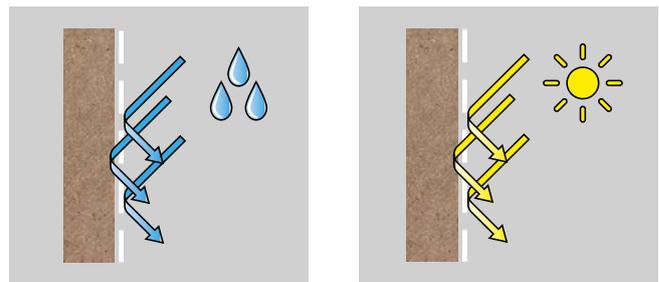


Figure 19: SIMOWOOD sanded and glazed

The surface of SIMOWOOD is partially exposed to water (rain) and UV rays.

**Cleaning:** SIMOWOOD should not be subjected to harsh (e.g. acidic, chlorine or solvent-based) cleaning agents as they may damage the surface of the material. We recommend spot-testing any cleaning agent on an inconspicuous area.

Dirt can be removed with a gentle stream of water (e.g. garden hose, high-pressure water blaster at an appropriate distance) or a soft brush. Stubborn grime (e.g. organic residues or greasy marks) may be removed with a harder brush or by lightly sanding the affected area.

**Care/maintenance:** Regular care (e.g. oiling) or maintenance is not necessary. Depending on where the material is used (floor, wall, facade etc.), the glaze may wear off to a greater or lesser degree. If required, the glaze can be renewed or reapplied at any time.

**Repairs:** To repair any scratches or damage, rub some of the glaze into the affected area with a cloth. To repair any larger damage, clean, lightly sand and reapply the glaze with a brush.

**Removal/renewal:**

1. Completely sand off the glaze
2. Reinstall the wood look and feel where necessary (use 24 – 60 grain sandpaper)
3. Reapply the glaze

### 3.4.3 SIMOWOOD sanded and sealed

**Properties:** As a result of applying the transparent Resysta® sealant, the sanded surface and small joints will also be sealed. This makes the surface more robust. It prevents water (rain), dirt and grease from penetrating the material. Dirt particles can be easily removed.

**Applying the seal:** Resysta® sealant consists of two components. It should be applied quickly (with a broad brush) within 30 minutes of being mixed. The sealant should not be used under the direct influence of sunlight.

SIMONA recommends using Resysta® sealers as they have been specially formulated for the material. For detailed information, please refer to the instructions for applying Resysta® seals.

**Cleaning:** SIMOWOOD should not be subjected to harsh (e.g. acidic, chlorine or solvent-based) cleaning agents as they may damage the surface of the material. We recommend spot-testing any cleaning agent on an inconspicuous area.

Water and a little dishwashing liquid (or soapy water) is all that is required. Stubborn grime (e.g. organic residues or greasy marks) may be removed with a soft brush.

In the case of sealed sheets, the primary focus should be on the durability of the varnish. For additional information as well as further details regarding cleaning and care, please visit [www.resysta.de](http://www.resysta.de).

**Care/maintenance:** Regular care (e.g. oiling) or maintenance is not necessary. Depending on where the material is used, (floor, wall, facade, etc.), the seal may wear off to a greater or lesser degree. If required, the seal can be renewed or reapplied at any time.

**Repair:** Even when mechanical damage occurs (e.g. scratches) no moisture will penetrate SIMOWOOD. So there is no need to fear that the coating will lift. To repair any damage, reapply the seal after prior cleaning and light sanding of the affected area. In the case of deeper scratches, the colour glaze may also need renewing.

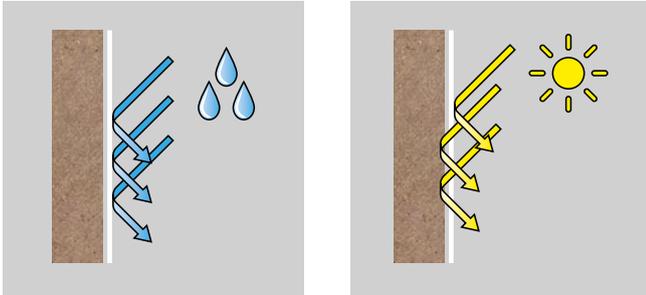


Figure 20: SIMOWOOD sanded and sealed

Water and grime are kept at bay. UV rays may have some effect on SIMOWOOD. The colour will intensify over time.

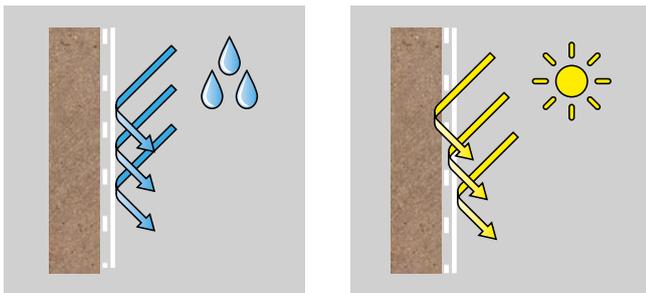


Figure 21: SIMOWOOD sanded, glazed (low-pigment colour) and sealed

Water and grime are kept at bay. UV rays may have some effect on SIMOWOOD. The colour will slightly intensify over time.

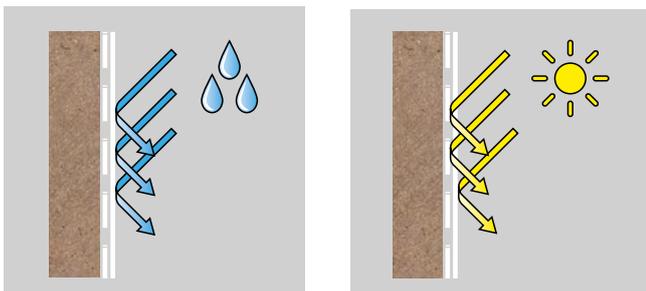


Figure 22: SIMOWOOD sanded, glazed (high-pigment colour) and sealed

Water and grime are kept at bay. Water and grime are kept at bay. UV rays have little to no effect on SIMOWOOD. The colour will slightly intensify over time.

#### Removal/renewal:

1. Completely sand off the seal
2. Reinststate the wood look and feel where necessary (use 24 – 60 grain sandpaper)
3. Reapply the sealer

**Note on the use of surface treatments:** The glaze and the seal are subject to normal wear and tear. The service life of these treatments depends on the individual usage and location in each case. Abrasive and mechanical stress may lead to scratching and greater wear and tear of the surface. Sheets subjected to a high degree of mechanical stress may be protected for a longer period by repeated application of the sealer.

**Fungal spores/heavy soiling:** Depending on the environment in which it is used, organic residues may be deposited on SIMOWOOD. These are the ideal breeding ground for the kind of fungal spores naturally present in the ambient air and may lead to staining. However, the material itself will not deteriorate as a result. For optimal protection, we recommend cleaning SIMOWOOD where required and removing any organic residues (e.g. leaves or foliage).

**Thermal expansion:** In the case of dark colours, the degree of material warming and resultant thermal expansion is greater than in the case of lighter colours. The difference may range from approx. 10 – 15 °C. This should be taken into account when installing the sheets.

### 3.5 Outdoor applications

Due to the aforementioned product properties and the excellent UV and weather resistance of this product, SIMOWOOD extruded sheets are generally also suited to outdoor fields of application. In addition to observing the statutory provisions set out in commercial and building laws/regulations, it is essential that those using this material take into account the aspect of thermal expansion when installing it.

**Screws/screw fixing:** When mounting any sheet, a fixed point should be selected. We recommend choosing one in the middle of the sheet. All other fixing points should be floating ones, so that the sheet can move freely in the event of any temperature changes.

For the fixed point, the hole should be drilled 0.7 – 0.8 times larger than the screw diameter. For the floating points, the diameter of the hole depends on the temperature range the sheet is likely to encounter. The mean thermal expansion coefficient should be taken into account in such calculations (0.043 mm/m/°C).

**Example:** A SIMOWOOD sheet measuring 2,500 mm x 1,250 mm is to be put to outdoor use in an area where the temperature ranges from -20 °C to +60 °C. Assembly occurs at 20 °C. The fixed point is attached to the centre of the sheet. This means the distance from the centre of the sheet to the edge is no more than approx. 1,400 mm. The temperature difference between the assembly temperature and the service temperature range is ±40 °C. Given a mean thermal expansion coefficient of 0.043 mm/m/°C, this means that in a 1,400 mm sheet a change in length of  $0.043 \text{ mm/m/}^\circ\text{C} \times 1.4 \text{ m} \times \pm 40 \text{ }^\circ\text{C} \approx \pm 2.4 \text{ mm}$  is to be expected. That means the sheet will become 2.4 mm smaller at -20 °C and 2.4 mm larger at +60 °C. So the diameter of the hole for the floating points should be drilled at least  $2 \times 2.4 \text{ mm} = 4.8 \text{ mm}$  larger than the shaft diameter of the screw.

The distance between the screws and the edge of the sheet must be at least 20 mm (see Figure 23). The screws can be mounted flush with the surface or countersunk. Please use stainless steel screws (A2) suitable for outdoor use. For further information, [please refer to 3.2.1 Screw fixing](#).

**Front-face protection:** SIMOWOOD displays no capillary action. However, moisture may penetrate hollow sections and cracked areas. Front-face paint protection is not strictly necessary, but recommended for aesthetic reasons. Water may be absorbed at surface level.

**Splashproofing:** To prevent stubborn grime or staining, we strongly recommend treating SIMOWOOD in this area with a sealant.

**Finishing:** Drill holes, dowel holes and cut surfaces that occur after assembly or mounting of the sheets should be glazed last. To repair any scratches or damage, dab some of the glaze on a cloth and apply it to the affected areas.

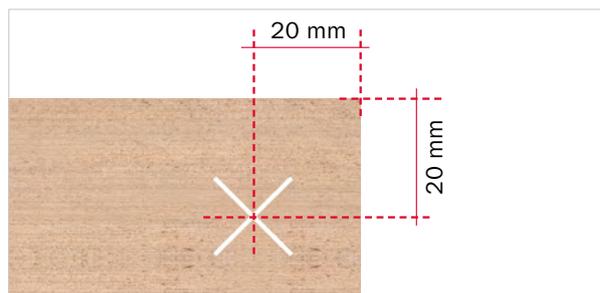


Figure 23: Distance of screws to sheet edge

#### Other important information

Constructions based on SIMOWOOD are to be completed in accordance with the latest technical standards and in keeping with the purpose and area of use. All associated regulations, statutory provisions and standards must be applied accordingly.

The illustrations in this tech.info are not technical drawings and do not depict any detailed solutions.

Dimensional tolerances are based on the requirements of DIN EN ISO 11833-1 (PVC sheets); for further details, please refer to our website [www.simona.de/download](http://www.simona.de/download).

## 4 Storage

### General advice on storage of SIMOWOOD

- Storage should be in a suitable building free of any moisture, temperature swings or direct sunlight.
- Any packaging straps should be released as soon as possible after delivery. If SIMOWOOD is repackaged, steel bands should be avoided wherever possible.
- Unilateral heating by any heat source is to be avoided.
- Sufficient ventilation of the material must be ensured. To avoid foxing or mould stains, the material should not be wrapped in plastic film.
- The sheets should be stored on a stable, level and well supported pallet that is at least as large as the size of the sheets. Individual sheets should be stored flat and lying down.
- An intermediate layer (e. g. cardboard) between the pallet and the semi-finished plastic product is recommended.
- Where block storage of several pallets is involved, we recommend using one pallet “head first” as an interim layer between each pallet to ensure the weight is evenly distributed.

## 5 Legal note and advice

### Legal note

Upon publication of a new edition all previous editions shall become void. The authoritative version of this publication can be found on our website at [www.simona.de](http://www.simona.de).

All information furnished in this publication reflects our current scope of knowledge on the date of publication and is designed to provide details of our products and potential fields of application (errors and omissions excepted, including typographical mistakes). This shall not be deemed as constituting the provision of legally binding guarantees or warranties as to specific properties of the products or their suitability for specific areas of application.

We provide warranty for the faultless quality of our products solely within the framework of our Standard Terms and Conditions of Business and only within the scope specified therein.

We shall assume no liability for the application, utilisation, processing or other use of this information or of our products. Furthermore, we shall assume no liability for any consequences related thereto. The purchaser is obliged to examine the quality and properties of these products; he shall be responsible in full for selecting, applying, utilising and processing said products as well as applying any information relating thereto, which shall also include all consequences associated with such actions. Third-party property rights shall be observed accordingly.

### Advice

Our applied technical advice is given according to our best knowledge and is based on the information you have provided and the state of the art known to us at the time such advice is furnished. The advice shall not constitute a guarantee or warranty of specific characteristics or qualities and shall not establish an independent contractual legal relationship.

We shall only be liable for cases of intent or gross negligence. Under no circumstances shall we be held liable for the correctness or completeness of information you have provided or the advisory/consulting services rendered by us on the basis of such information. Any information provided by us shall not release you from your obligation to conduct your own assessments and evaluations.

We reserve the right to update information without notice as part of our continuous research and development programme.

Our sales staff and members of the Technical Service Centre look forward to advising you on all issues relating to the processing and application of semi-finished thermoplastics.

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[tsc@simona.de](mailto:tsc@simona.de)

# 6 EC Safety Data Sheet

according to 1907/2006/EC Article 31

Trade name: **SIMOWOOD made of Resysta®**

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## 1. Identification of the substance/mixture and of the company/undertaking:

- Manufacturer details:  
SIMONA AG  
Teichweg 16  
D-55606 Kirn  
Phone +49(0)67 52 14-0  
Fax +49(0)67 52 14-211

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## 2. Hazards identification

- Unknown

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## 3. Composition/information on ingredients

- Chemical characteristics: hybrid material based on rice husks and a thermoplastic
- CAS number: not applicable

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## 4. First-aid measures

- General comment:  
medical aid is not necessary
- First-aid measures: none
- Routes of exposure: none
- Symptoms/effects: none

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## 5. Firefighting measures

- In case of fire, please use gas mask and self-contained breathing apparatus. Fire residues must be disposed of in accordance with local regulations.
- Suitable extinguishing media: water haze, foam, fire fighting powder
- Hazard warning notice: not applicable

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## 6. Accidental release measures

- Person-related measures: none
- Environmental protection measures: not applicable
- Cleaning equipment: not applicable
- Unsuitable cleaning products: not applicable

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## 7. Handling and storage

- Handling: no special regulations to be observed
- Storage: storable for an unlimited period

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## 8. Exposure controls/personal protection

- Special design of technical processing facilities:  
not required
- Tolerance levels: none
- Exposure assessment: none
- Respiratory protection: not required
- Eye protection: not required
- Body protection: not required

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## 9. Physical and chemical properties

- Appearance  
Physical state: solid, semi-finished product  
Colour: brown (sanded on one side)  
Odour: not applicable
- Change of state  
Flash point: not applicable
- Other remarks  
Density: 1.49 g/cm<sup>3</sup>

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### 10. Stability and reactivity

- Thermal decomposition: above approx. 200 °C
- Hazardous decomposition products: In addition to hydrochloric acid, carbon dioxide and water will develop during the burning process. In the case of incomplete burning, carbon monoxide and traces of phosgene may also be present.
- Use of stabilisers: none
- Exothermic reactions: none
- Notices regarding state of aggregation: none
- Conditions to be avoided: none
- Substances/media to be avoided: none

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### 11. Toxicological information

No hazardous effects on health were observed over several years of usage.

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### 12. Ecological information

No biodegradation, no solubility in water, no hazardous effects on the environment are to be expected.

- Mobility: not applicable
- Accumulation: not applicable
- Eco-toxicity: not applicable

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### 13. Disposal considerations

- Can be recycled or can be disposed of together with household waste (in accordance with local regulations).
- Waste key for the unused product: EAK-Code 120 105
- Waste name: plastic waste

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### 14. Transport information

- No dangerous product in respect of transport regulations
- Notice/symbol transport containers: none
- Special marking for containers: none

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### 15. Regulatory information

- Marking according to GefStoffV/EG: no obligation for marking
- Water danger class: class 0 (self classification)
- Domestic requirements to be observed: none

---

### 16. Other information

This information solely describes the safety requirements of the product(s) and is based on our current state of knowledge. It does not give any assurance concerning the product(s) described within the meaning of statutory warranty regulations.

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